MONTHLY WEATHER REVIEW,

JULY, 1877.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

The present Review for the month of July depends on all data received up to the 14th of August from the Canadian Meteorological Service, the United States Navy, the Army Post Surgeons, Voluntary Observers and the United States Signal Service. The most interesting features have been: First, The few storms reported at sea. Second, The unusually large number of tornadoes occurring the first ten days of the month. Third, The general diminution of grasshoppers and locusts, and the slight amount of damage done by them as compared with the several years previous.

BAROMETRIC PRESSURE.

In General.—The general distribution of barometric pressure for the month is shown by the isobars on chart II, from which it will be seen that the highest pressure has been off the South Atlantic and Gulf coasts, both of these districts being included in the isobar of 30.00. The pressure has diminished very regularly from the coast in a northwest direction to Dakota, where the lowest average for the month will probably be found. There has been a general deficiency of pressure in comparison with past years, which is most marked in the South Atlantic States and the least marked in the Northwest. In the Rocky Mountains the deficiency has been about .04 of an inch, and nearly the same on the Pacific slope.

Barometric Range.—The general range of the barometer over the whole country east of the Rocky Mountains was about 1.03 inches, as may be seen from the following table, which gives the maximum and minimum pressures that occur on the tri-daily maps near the centres of the respective areas of high and low barometer:

LOW AREAS.				HIGH AREAS.			
No.	Location.	Date.	Minimum Pressure.	No.	Location.	Date.	Maximum Pressure.
I	Lake Huron	July 1st, 7:35 a. m	29.45	I	South Atlantic States	July 1st, 7:35 a. m	30.17
II	Upper Mississippi val	July 2nd, 4:35 p. m	29.56	II	Norfolk	July 8th, 7:35 a. m	30.15
III	Lower Missouri valley	July 6th, 4:35 p. m	29.46	III	South Atlantic States	July 15th, 7:35 a. m	30.14
IV	East Gulf States	July 10th, 4:35 p. m	29.80	IV	Toronto	July 23rd, 7:35 a. m	30.30
V	Lower Missouri valley	July 14th, 4:35 p. m	29.28	V	Halifax	July 28th, 7:35 a. m	30.17
VI	Lower Lakes	July 19th, 7:35 a. m	29.48	VI	Montgomery	July 28th, 7:35 a. m	30.16
VII	Manitoba	July 27th, 4:35 p. m	29.53	VII	Quebec	July 31st, 4:35 p. m	30.20
VIII	Lower Missouri valley	July 30th, 4:35 p. m	29.27				

The greatest local barometric ranges have been as follows: 0.94 at Bismarck and North Platte; 0.86 at Alpena, and 0.82 at Escanaba.

The least local barometric ranges have been: 0.29 at Galveston; 0.32 at Indianola; 0.35 at New Orleans, Vicksburg, Memphis and Mobile.

Areas of High Pressure in General.—The areas of high pressure have been of two kinds—partly encroachments of the high summer barometer that prevails over the North Atlantic Ocean and partly due to areas of cold dry air flowing from the great plateau east of the Rocky Mountains and closing up the rear of the low pressures that have crossed the country during the month.

No. I—Was a continuation of the high pressure No. VIII of June, which, on the morning of the 1st, was highest in the South Atlantic and Gulf States, where it ranged above 30.10. This pressure slowly diminished, with southerly winds, disappearing as a high area during the 5th and 6th.

No. II.—The barometer rose slowly in rear of low pressure No. II in the Lake region during the night of July 3rd and 4th. This high area gradually moved to the eastward until the 7th, when it slowly extended itself along the Atlantic coast, giving rise to southerly winds preceding the development of low barometer No. III. It gradually moved to the Gulf States and disappeared as a high pressure on the 9th.

No. III.—This high pressure first appeared in Manitoba on the 9th, in rear of low barometer No. III; it remained nearly stationary until the 10th, when it moved in a southeasterly direction over the Lake region, Tennessee and the Ohio valley; on the 14th, it had extended over the South Atlantic States, where the pressure rapidly rose, giving rise to southerly winds preceding the development of low barometer No. V; from that day it gradually diminished as a high pressure, and on the 18th disappeared.

No. IV.—The pressure rose rapidly in the Northwest during the 19th, in rear of low barometer No. VI, and extended southerly to the Gulf and gave rise to "northers" in Texas on the 20th and 21st; it then moved easterly until, on the morning of the 23rd, the isobar of 30.20 extended over the Upper Mississippi valley, Lake region and Middle States, with the general pressure remarkably high for the month; on the morning of the 24th, the isobar of 30.20 had slowly moved to the east and south; from that time it slowly diminished, with southerly winds, while extending over the South Atlantic and East Gulf States until the afternoon of the 26th, when it ceased to exist as a high area.

No. V.—The pressure rose rapidly in Nova Scotia on the 27th, remained high until the 28th, and then diminished, with southerly winds, in advance of low barometer No. VIII.

No. VI.—The pressure rose slowly in the South Atlantic and Gulf States on the 27th and 28th, during the progress of low barometer No. VIII to the east, and disappeared, with southerly winds, on the 29th.

No. VII.—The pressure rose in the Lake region on the 30th in the rear of low barometer No. VII and moved in an easterly direction over Canada, and on the 31st extended over the New England and Middle States, giving rise to the cold northeast winds that prevailed at that time. The rest of the history of this pressure belongs to the August Review.

Areas of Low Pressure in General.—Eight areas of low pressure are given in the following list, only six of which, however, were sufficiently defined to have their tracks charted. In general the storm paths lie more to the north than for any year since the paths have been traced in this office. It has not been possible, with the insufficient data at hand, to determine whether or not any well-defined low area has moved from the Pacific coast over the Rocky Moutains, although there are several instances when the pressure has been low on the Pacific slope two or three days in advance of depressions becoming manifest in the extreme Northwest and Manitoba.

No. I.—This depression was referred to in the June REVIEW as No. XII, and its path charted until 11 p. m. of June 30th. On the 1st of this month the lowest pressure was central north of Lake Huron; rain prevailed, with warm southerly winds, in the Lake region, Canada, Middle and New England States, and cold north winds were blowing in the Upper Mississippi valley, with clearing weather. At 4:35 p. m. of the 1st the centre of the storm had advanced rapidly to the eastward, and was nearly north of Lake Ontario. On the morning of the 2nd the lowest pressure was near the mouth of the St. Lawrence river; in its rear this depression was rapidly closed up by cold northwest winds and clearing weather. The heaviest rain-falls on the limits of the map were in the Middle and New England States, and occur in the southeast quadrant of the low pressure; its path for July is charted entirely in Canada.

No. II.—This depression apparently originated in the high plateaus east of the Rocky Mountains and west of the Upper Missouri river. On the afternoon of the 1st it was central in Dakota. At 4:35 p. m. of the 2nd, the lowest pressure had advanced eastward and was central near Duluth. Warm southerly winds, with light rain, prevailed in the Lake region. On the afternoon of the 3rd the depression had moved in a southeasterly direction into the Lower Lake region, and then progressed over the Middle and New England States; and on the 4th it disappeared off the coast of the latter district. The rain-fall in the eastern portion of its track was much more general and heavy than in the Northwest, where there was a decided deficiency in precipitation; its progress was not marked with very decided changes of temperature or by very high winds; its track east of the Lake region was the most southerly of any during the month.

No. III.—This depression apparently was developed in Dakota during the 5th and 6th instants, due to the prevalence of the southerly winds in the plateau west of the Mississippi river, that had been constantly blowing in that direction from the Gulf of Mexico since the 1st of the month. At midnight of the 6th, the winds immediately east of the Rocky Mountains had shifted to colder northwest. On the afternoon of the 7th, the lowest barometric pressure extended like a trough from Lake Superior to Kansas, and for the next two days opposing warm southerly and cold northerly winds prevailed on the opposite sides of this depression over the country from the Lake region to the Indian Territory. At 7:35 a. m. of the 9th, the barometer was lowest near Lake Ontario; from that time the depression moved rapidly to the northeast, and on the 10th, disappeared in the Gulf of the St. Lawrence. This depression was chiefly remarkable for the destructive tornadoes that occurred in the West; for the heavy rain-fall in Kansas, occasioning destructive floods in the Missouri valley. The heaviest rain-falls accompanying this depression were in its southwest quadrant, occurring after the veering of southerly winds to west and north.

No. IV.—The barometer fell on the 10th, in the South Atlantic and Gulf States, to the south of high area No. III; it was accompanied by general and heavy rain-fall in those districts, but by slight changes in temperature and no high winds. There is no evidence of the translation of this area, and no path is charted.

No. V.—On the 13th, the winds in the Northwest shifted to southeast in advance of depression No. V, whose centre at 7.35 a. m. of the 14th is charted in Dakota. On the afternoon of the 15th this depression extended in a barometric trough from Lake Superior to west Texas, with opposing north and south winds. The rain-fall was light and unusually near the centre of the depression. The storm was followed by a marked fall in temperature; the centre is charted at 4.35 p. m. of the 15th, in Lake Superior; from that time there was no apparent translation of the depression. The barometer remained low in this region until the 17th, when its place was filled by the depression charted as low barometer No. VI.

No. VI.—This depression was probably developed in British America, east of the Rocky Mountains, during the 15th and 16th, in advance of the high pressure that was on the North Pacific coast at that time. On the 18th, this depression moved in a southerly direction, and at 4.35 p. m. the barometer was lowest in Southern Michigan; it remained lowest in the Lower Lake region until the 19th, and then moved rapidly up the St. Lawrence valley, with a track too indefinite to chart after the 20th instant. This was one of the most southerly storms of the month, and after the 17th, it became the best defined as a cyclone; it was rapidly followed by high area No. IV. During its progress very heavy and frequent rains fell east of the Mississippi river. There was a decided deficiency of precipitation in the Northwest. The rain fell in the greatest abundance in the southwest quadrant of the depression, as is frequently the case in the summer months.

No. VII.—A continued trough-like depression existed in Manitoba, Dakota, and the extreme Northwest from the 24th of July until the 27th, in rear of high pressure No. IV; it had no track that, with the data in the possession of this office, can be charted up to that time, but on the morning of the 27th its centre can be placed to the east of Pembina. It moved slowly to the southeast in the Lower Lake region, and, on the 29th, took a path slightly to the north of the St. Lawrence river, and probably disappeared off the coast of the British maritime provinces in the early days of August. It was attended by numerous local but not heavy rains over the Lake region and New England States; heavy rain fell at the same time in Texas between the high area in the Gulf States and the high pressure in rear of this depression, moving in a southerly direction over the plains.

No. VIII.—At 7:35 a. m. of the 28th, a marked fall of the barometer took place in Manitoba and Dakota. By the 31st the winds immediately east of the Rocky Mountains had shifted to colder northwest. By the end of the month the depression was not sufficiently defined to have its track charted. But little rain fell. Its further history belongs to the August REVIEW.

Vessels Experiencing Storms at Sea.—4th, off Chincoteague, a revolving gale; 21st, N. 50° 35′, W. 19° 25′.

TEMPERATURE OF THE AIR.

In General.—The general distribution of temperature for the month is shown by the isotherms on chart No. II. A comparison with the averages for July during the past seven years shows that the temperatures have been about normal in the St. Lawrence valley, New England, Ohio valley, Tennessee and Upper Mississippi valley; slightly above the average in the Middle, South Atlantic and Gulf States, Lake region and Pacific coast.

Monthly mean temperatures, at special points, have been as follows: Mt. Washington, 49°.2; Pike's Peak, 39°.1.

Maximum and Minimum Temperatures.—Maximum temperatures, at Signal Service stations, above 95°, were reported as follows: 96°, Bocrue, Cheyenne, Galveston, Keokuk, La Crosse, Lynchburg, Memphis,